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The cerebral light is located in those higher centers of the brain which are connected with visual memories and imaginations. While watching the cerebral figures I find that my visual memories or phantastic figures appear in the midst of the cerebral light and frequently cannot be distinguished from them. The close connection of these cerebral figures with the contents of dreams has been repeatedly noticed by Johannes Müller and a series of later observers. There is also the possibility that the hallucinatory visions produced by hashish, mescal and other drugs may be simply modifications of this cerebral light.

E. W. SCRIPTURE.

YALE UNIVERSITY, May 21, 1897.

SCIENTIFIC LITERATURE.

Grundriss der Entwicklungsgeschichte des Menschen und der Säugethiere von DR. MED. OSCAR SCHULTZE. Bearbeitet unter Zugrundelegung der 2. Auflage des Grundrisses der Entwicklungsgeschichte von A. Kölliker. Leipzig, Engelmann. 1897. 8vo. Pp. vii + 468.

Kölliker's well known manual has been so thoroughly reworked by Professor Schultze that it is essentially a new work. In Kölliker's volume the embryology of the chick furnished many of the descriptions and illustrations. Schultze has omitted the chick altogether, confining himself strictly to mammalian development, and has added a comprehensive though very condensed account of the fetal membranes and placenta in the chief groups of mammals. Many new and admirable figures have been added, of which a considerable majority are original and taken from the author's own preparations.

It is exceedingly difficult to characterize Professor Schultze's text-book fairly, for it combines superior merits with conspicuous and singular defects. It is utterly inadequate as a presentation of contemporary embryology, for it systematically neglects the morphological, phylogenetic and mechanical aspects of embryology, and consequently reads almost like an old-fashioned descriptive anatomy. An embryological writer might be excused for avoiding phylogenetic and mechanical themes, but the

neglect of morphological considerations makes full success in writing a text-book an impossibility. To illustrate these criticisms it suffices to examine the account of the nervous system; in the development of this the history of the neuroblasts and of the division of the medullary tube into dorsal and ventral zones are the fundamental facts morphologically, but our author barely describes the neuroblasts, does not figure them at all, and makes no allusion to the two zones, which should form the basis of the whole account, for without understanding these zones no student can master even the rudiments of our present knowledge of the brain and spinal cord. Again, the epidermis is equally maltreated, for the history of the epitrichium is incorrect, and no mention whatever is made of the fact that the nails are modifications of the stratum lucidum. Erroneous are also the accounts of the development of the glands in the stomach, which do *not* develop in the same way as those of the intestine; misleading is the history given of the supra-renals, for the so-called medulla of the organ in the human species is not derived from the sympathetic *Anlage*. There are mistakes in the illustrations: in Figs. 194 and 195 the 'Zwischenhirn' (Diencephalon) is correctly designated, but in Figs. 217 and 263 the same division of the brain is called 'Mittelhirn' (Mesencephalon); in Fig. 327 the left side of the heart is called '*rechte Kammer*' and the right side '*linke Kammer*,' while the great vein is labeled 'Sympathicus!' Of the index complaint must be made: one searches it in vain for Hirnblasen, Nerven, Thyroidea and other headings.

In spite of these criticisms, which indicate that the usefulness of the book is severely limited, the manual remains one of many merits and of great value. The author is felicitous in his combination of brevity and clearness, and in avoiding cumbrous accumulations of details. The faulty illustrations are exceptions; very good ones indeed are the rule, good both in selection and execution. In printing them the publishers have sustained their high reputation in this regard. The author has studied at first hand, and is thereby enabled to make his descriptions fresh, vivid and interesting, and if he had included in his point of view

the recognition of relative morphological values he would have prepared a work of signal utility. The student who uses the 'Grundriss' as his guide may acquire a fair knowledge of the empirical facts of embryology, but he will still have to learn the morphological interpretation of these facts and their relative importance. Meanwhile he will have profited by better, more available and more matter-of-fact descriptions of the anatomy of embryos than can be found in perhaps any other of the smaller textbooks of embryology.

C. S. MINOT.

Das Süßwasserplankton, Methode und Resultate der quantitativen Untersuchung. Von DR. CARL APSTEIN, Kiel, Zool. Institut. Mit 113 Abbildungen. Kiel und Leipzig, Verlag von Lipsius & Tischer. 1896. 200 pp., 5 Tabellen.

To Dr. Apstein, of the school of planktologists at Kiel, is to be given the credit of applying the methods employed by Professor Hensen in his investigations in the Baltic and North seas, and on the 'National' Expedition of 1889, to the quantitative investigation of the plankton of fresh water. His field of operations has been the lake region of Holstein. The book contains a full report of the results of the quantitative, and to some extent the qualitative, examination of more than 300 collections made in 15 different lakes during 1890-1895. A description is given of the apparatus, methods of collection, of determination of volume, and of enumeration of the constituent organisms or planktonts, if we adopt the term recently introduced by Schröter. There is, unfortunately, no adequate discussion of the margin of error which the methods involve. An annotated list of the important limnetic organisms is given with data on the seasonal distribution, abundance with dates of maximum and minimum occurrence and reproductive activity, with other facts of ecological import. Many of the forms are illustrated by reproductions from original microphotographs by the author. The microscope in the hands of the skillful operator reveals vastly more than the ordinary microphotograph records. For the purposes of scientific illustration of organisms of the plankton,

and especially in such a book as this, it seems undesirable to substitute a method which rests upon the relative opacity of tissues simply, for one based upon the clear interpretation of the trained observer. One has only to contrast Dr. Apstein's best results in this line with the figures he reproduces from Hudson and Gosse, and Lauterborn, to appreciate the superiority of a carefully made drawing in conveying to the inquirer details of structure, and even such features as contour, proportion and natural position of parts. The book is not a manual of the limnetic fauna and flora, and the novice and casual student must still depend upon monographs and the widely scattered literature of the subject for aid in the determination of the planktonts. It is, however, an epitome of the subject, indispensable to every planktologist and a valuable aid to every student of fresh-water fauna.

Our author distinguishes active, passive and tycho-limnetic forms among the planktonts. With the latter he places *Diffugia*, whose presence in the open water is attributed to gas vacuoles, which cause it to rise from the bottom, its true habitat. *Diffugia* is a very abundant and important member of the plankton of our own great lakes, where it occurs in association with *Codonella*, *Dinobryon* and other typically limnetic forms. It also occurs in the Illinois river and its adjacent waters throughout a considerable part of the year, but in the open water and not upon the bottom. The conditions of the occurrence are such as to place it among the active members of the plankton rather than among those which owe their presence to the accidents of wind and current.

Following up the line of his earlier work, Apstein brings forward a long series of observations in proof of the equal horizontal distribution of the plankton in a body of water. In 80 catches the greatest departure from the mean was 22.8%, and the average departure but 5.52%. These hauls are distributed in short series of 2-5 parallel catches in various lakes, but the distance separating the successive collections is not given, and in no case has a lake been subjected to a larger number of examinations made upon the same day at frequent and regular distances throughout its whole extent. It seems